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United States Navy

MEDICAL NEWS LETTER

Vol. 42 Friday, 2 August 1963 No. 3

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Policy

The U. S. Navy Medical News Letter is basically an official Medical Department publication inviting the attention of officers of the Medical Department of the Regular Navy and Naval Reserve to timely up-to-date items of official and professional interest relative to medicine, dentistry, and allied sciences. The amount of information used is only that necessary to inform adequately officers of the Medical Department of the existence and source of such information. The items used are neither intended to be, nor are they, susceptible to use by any officer as a substitute for any item or article in its original form. All readers of the News Letter are urged to obtain the original of those items of particular interest to the individual.

Change of Address

Please forward changes of address for the News Letter to: Commanding Officer, U. S. Naval Medical School, National Naval Medical Center, Bethesda 14, Md., giving full name, rank, corps, and old and new addresses.

The issuance of this publication approved by the Secretary of the Navy on 28 June 1961.

Some Effects of Maternal Cigarette Smoking on the Fetus

By LT John M. O'Lane MC USN*, U. S. Naval Hospital, San Diego, Cal.

Three recent reports, (1), (3), and (4) have shown that mothers who smoke have an increased incidence of premature infants. Heavier smokers had higher percentages of prematures than lighter smokers. The infants of smoking mothers were significantly lighter than those of nonsmoking mothers.

This study was designed to explore certain factors bearing on the mechanism of this phenomenon. These important questions have arisen:

1. Is the difference due to a shortening of gestation in smokers, i.e., do smoking mothers deliver earlier than nonsmokers?
2. Is the smaller weight due to retarded skeletal growth of the fetus, or only due to reduced adipose tissue?
3. Is the smaller weight of smokers' babies due to reduced maternal food intake, or mediated by some placental factor, such as vasoconstriction of uteroplacental vessels?

METHODS AND MATERIALS

The study group consisted of 1031 Caucasian women who had single pregnancies that were delivered vaginally during the period from December 1961 through June 1962. Women who started or stopped smoking during their pregnancies were excluded. Women whose babies weighed less than 500 grams were also excluded.

At the time of delivery, the required information was recorded. The standard U. S. Naval Obstetrical Code Sheet—which contained 75 items—was used. Four additional questions were added dealing with information of importance for this study: patient's smoking habits, race, fetal length, and placental weight. The historical information was obtained from the patient's prenatal records and from direct questioning in the hospital. Finite parameters such as fetal length and weight, were recorded promptly after delivery. Placental weights were determined after removing excess clots and blood. The membranes were trimmed away and the umbilical cord cut one centimeter from the placenta. Following completion of the questionnaire, the information was coded onto machine punch cards. Analysis of the data was performed using the punch card sorting technic.

The group consisted of 566 nonsmokers and 465 smokers. Women classed as smokers were those who regularly smoked each day. Those not smoking daily were excluded. Those classified as nonsmokers did not smoke at all during pregnancy. The smokers were divided into groups according to the number of cigarettes smoked daily. Because of the relatively small numbers in some groups it was decided to treat all smokers in one group (Table 1).

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The patients were otherwise unselected, being picked up for the study in the order in which they delivered.

Table 1

Distribution of Patients

No. Cigarettes Smoked Per Day	No. of Patients
0	566
1-5	56
6-10	77
11-15	59
16-20	194
over 20	79
	465

RESULTS

The two groups were evaluated in regard to certain parameters to determine if the groups were indeed statistically comparable. No difference was found in respect to the following: age, prenatal care, complications of previous pregnancies, complications of the current pregnancy, including toxemia, antepartum maternal hemoglobin concentration, and blood types and Rh distribution.

After deciding that the two groups were, in fact, drawn from the same population in a statistical sense with the exception of their smoking habits, they were compared in respect to the parameters of most interest in this investigation, that is, in respect to fetal weight, fetal length, length of gestation, Apgar rating, maternal weight gain, placental weight, and perinatal mortality rate.

The average weight of the smokers' babies was 2938 grams, compared to 2978 grams for the nonsmokers'—a difference of about one and one-half ounces. The difference in weight is brought out more dramatically by comparing the percentage of premature babies (under 2500 grams) in the two groups. The smokers had significantly more premature deliveries than the nonsmoking group; 11.8% for the smokers versus 5.1% for the nonsmokers. (Table 2)

Table 2

Premature Deliveries

	Nonsmokers	Smokers
Patients	566	465
No. of Prematures	29	55
	5.1%	11.8%
Difference 6.7%		
Standard Error 1.8%		

The smokers' babies averaged 0.5 inch less in crown-heel length than did the nonsmokers' babies. The nonsmokers' mean fetal length was 20.3 inches (S. D. 1.8) while the smokers' was 19.8 (S. D. 1.7). This difference is meaningful (S. E. 0.11). (Table 3) The length of gestation in the two groups was not very different.

Table 3

Fetal Length

		Nonsmokers	Smokers
Average		20.3 inches	19.8 in.
Standard Deviation		1.8 "	1.7 "
Difference	0.5 inches		
Standard Error	0.11 "		

The 465 mothers who smoked had had 112 abortions prior to the current pregnancy, in contrast to the 91 abortions experienced by the 566 nonsmoking mothers. The average abortion rate (including the current pregnancies) was 12.6% for the smokers and 8.9% for nonsmokers. This difference is important. (Difference = 3.7%; S. E. 1.43%). (Table 4)

Table 4

Previous Abortions

		Nonsmokers	Smokers
Patients		566	465
Previous Pregnancies		461	422
Abortions		91	112
Rate		8.9%	12.6%
Difference	3.7%		
Standard Error	1.43%		

The Apgar scores of the nonsmoking group's babies were considerably higher than those of the smoking group's infants (8.63; S. D. 1.23 vs 8.18; S. D. 1.63). (Table 5)

Table 5

Apgar Scores

		Nonsmokers	Smokers
		8.63	8.18
Standard Deviation		1.23	1.63
Difference	0.446		
Standard Error	0.092		

No significant difference was found in the mean weight gain of the two groups, nor in the mean initial weight of the two groups, or in the mean placental weights of the two groups. A difference of 0.001 (0.147 vs 0.148) in the placental/fetal ratio was recorded, but no difference in the fetal and perinatal death rate of the two groups.

COMMENT

This study confirms earlier reports that babies born of smoking mothers are significantly lighter in weight than those whose mothers did not smoke. The premature rate was over twice as great in the smoking group.

Of considerable interest is the finding that the smoking group babies were shorter than the nonsmoking group. Everyone realizes that the measuring of the crown-heel length of a newborn is quite inaccurate, and at first glance a difference of only one-half inch between the two groups may not seem impressive. However, those measuring the babies had no knowledge of the group into which a particular child fell, and there is no reason to believe that the babies in one group were less accurately measured than those of the other. Assuming that the measurements were equally accurate for each group, the 0.5 inch difference is meaningful in this study. Thus, the growth of newborns whose mothers smoked during pregnancy was reduced, and the reduction involved both length and weight. This would seem to be a more marked effect on the fetus than just weight reduction alone, which might represent merely a lessening of fetal adipose tissue.

The mechanism of this reduction of fetal size apparently is not related to a lessening of maternal food intake because of a possible anorexic effect of tobacco. In this study, there was no particular difference in the maternal weight gain during pregnancy. As the mean group weights were the same before pregnancy, the percentage of body weight gained during pregnancy was statistically equal.

The length of gestation was approximately the same in the two groups. Therefore, variations in fetal size cannot be explained on this basis.

Apgar scores of the nonsmoking group infants were higher than those of the smoker's group. While the difference is small, and while it is admitted that an Apgar score is a subjective opinion which may vary from observer to observer, the patients of each group were randomly mixed in such a way as to make it unlikely that bias on the part of observers might have influenced the results. If it is agreed that the determinations of the Apgar scores were equally accurate for each group (and the author feels there is no reason to doubt this accuracy) a variance of considerable weight was found between the two groups. The comparison of 8.6 to 8.2 is of no immediate clinical importance, but it may represent a subtle influence of cigarette smoking on the well-being of the newborn infant.

The group of smoking mothers had a greater incidence of prior abortions than the nonsmoking group. This information should be interpeted with caution in view of the relatively small number of abortions involved in each group. While it might be argued that this represents an area in which the

groups were not well matched initially, the conclusion that smoking is somehow related to an increased abortion rate is evident. A larger series than the one studied here might provide a more clear-cut answer to this question.

The mean placental weights of the two groups showed little difference; in fact, the placental/fetal ratio was somewhat higher in the smokers' group than in the nonsmokers'. The relationship of the placenta to the observed fetal differences thus remains obscure. Whether it is due to vasoconstriction of placental vessels, to toxic substances such as carbon monoxide in the blood (2), or to some other unsuspected factor cannot yet be guessed. However, whatever the mechanism, it is not associated with a reduction in the placental weight.

It is not certain that the act of smoking itself causes the differences observed in this study. It may be that smoking is associated with an underlying disturbance, such as emotional strain, for example, which may be the true initial factor. However, it seems clear that, whatever the mechanism, newborns of mothers who smoked during the pregnancy differ in measurable ways from those whose mothers were nonsmokers.

References

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NOTE: This is another good example of how data processing services in our hospitals may be employed with great advantage in arriving at clinical analyses, summations, and conclusions. It is anticipated that, in the foreseeable future, extensive utilization of electronic computer technics will be the established procedure in orthopaedic, pediatric, and tissue bank studies. It has already been of great help in tuberculosis surveys and in the Obstetrical study. The Data Processing Division of BuMed will welcome comments and suggestions on future planning for program developments.

—Editor

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Cardiovascular Surgery - U. S. Naval Hospital, Bethesda, Maryland

By CDR J. E. McClenathan MC USN. From the Proceedings of the Monthly Staff Conferences of the U. S. Naval Hospital, NNMC, Bethesda, Md., 1961 - 1962.

Cardiovascular surgery is now well established as one of the surgical specialties. Its origins come from the pioneering of Astley Cooper and John Hunter in their attempts at treatment of aneurysms at the turn of the 18th century. The problems of infection and adequate anesthesia plagued those who attempted this type of surgery in the 19th century; however, Williams in Chicago and Rehn in Germany are credited with successful exploration and repair of traumatic lesions of the heart. Tuffier in France attempted correction of aortic stenosis in 1912 and Doyen attempted relief of pulmonary stenosis in 1913. Souttar in London believed the stenosis of rheumatic mitral disease might be relieved by trans-atrial digital commissurotomy and tried this procedure in 1925.

In general, cardiovascular surgery really entered the modern era in 1939 when Gross in Boston successfully ligated a patent ductus arteriosus. Crafoord in Sweden and Gross independently repaired coarctation of the aorta in 1944 and in 1945 Blalock performed the procedure of subclavian artery-pulmonary artery anastomosis as palliation for the Tetralogy of Fallot. In 1953, Gibbon, after many years of laboratory work, successfully repaired an atrial septal defect with the aid of extracorporeal circulation.

Few, if any, of the recent advances in cardiovascular surgery would have been possible if it were not for innovations in the ancillary services such as anesthesiology and hematology. Hypothermia, first described by Baron Larrey, Napoleon's surgeon in 1812, and further developed by Fay and Smith in Philadelphia and Bigelow in Toronto, presented a valuable tool for making periods of circulatory arrest safer. It is now combined with many "pump" procedures and localized cardiac hypothermia permits safe cardioplegia. The work of Meltzer and Auer early in the 20th century contributed much to the knowledge of pulmonary ventilation, and further refinements of endotracheal anesthesia have permitted open thoracotomy.

Blood typing and cross matching is now an extremely refined procedure and continued support of the Blood Bank is a sine qua non of a busy cardiovascular surgical service. In the past year, the demands upon the Blood Bank have been materially reduced by partially priming the pump oxygenator with Rheomacrodex, a low molecular weight dextran.

Cardiovascular surgery makes severe demands upon the surgeon's time, patience, and ingenuity. It requires an abundance of understanding and a sincere appreciation of the emotional demands upon patients and relatives alike. A well trained operating room team and recovery room team are necessary for a successful program. Close liaison between surgeon and cardiologist in the selection, pre-and postoperative care and follow-up care cannot

be overemphasized. A major part of the credit in this program is due directly to outstanding cardiologists. Support by the laboratory is essential. This requires the combined and painstaking efforts of all the above to restore to health the "high risk" group of patients who have surgically correctible cardiovascular defects.

An over all review of cardiovascular surgery at the U.S. Naval Hospital, Bethesda, Md., shows a tremendous annual increase in the number of patients treated since 1951. There were 730 procedures performed with an over all mortality of 7.8%.

1951	15	1957	41
1952	16	1958	28
1953	31	1959	97
1954	18	1960	107
1955	36	1961	123
1956	51	1962	101

Brief discussion is made of arbitrary categories including the pathologic physiology, laboratory, X-ray and electrocardiographic findings, together with the indications for surgery and the results. The headings include patent ductus arteriosus, coarctation of the aorta, mitral stenosis, tetralogy of Fallot, peripheral vascular, and aortic valvular lesions, pulmonic stenosis, atrial and ventricular septal defects. Another heading listed as "Miscellaneous" is included to complete the total and only the operations done in 1961 are listed as representative of this group.

Patent Ductus Arteriosus

Patients	89	
Mortality	0	
Ages	3	weeks to 35 years
Complicated	6	

These 89 patients include one recanalized ductus which was divided 11 years after ligation in continuity had been performed elsewhere. Included is 1 aorto-pulmonary window which was doubly ligated. Six of the 89 patients had significant pulmonary artery hypertension, 3 possibly on the basis of associated ventricular septal defect.

The ductus usually closes during early extrauterine life and is pathologic if open at one year of age. In this series as in others, females predominate. The presence of an open ductus permits a left to right shunt and, therefore, the patient is acyanotic. Usually the child is asymptomatic unless the ductus is very large. X-ray and fluoroscopic studies indicate mild cardiac enlargement, prominent pulmonary arteries (hilar dance), and increased pulmonary vasculature. The electrocardiogram reveals biventricular hypertrophy with evidence of right ventricular enlargement in V_{-1} and left ventricular preponderance in lead V_{-6}. Cardiac catheterization is reserved for those

patients in whom the left second intercostal "machinery murmur" is atypical or in whom evidence of desaturation with atypical electrocardiographic findings is present.

Indication for surgery in the early weeks of life is usually the presence of recurrent pulmonary infection or frank heart failure; in older children the clinical diagnosis of the lesion alone suffices. Three of the older cases in this series were complicated by the presence of atherosclerotic degeneration or aneurysmal enlargement of the ductus or the adjacent aorta.

Not included in the 89 cases, but included under "Miscellaneous" procedures, was one 19-year old Marine who had a somewhat atypical murmur and was found to have a coronary artery right ventricular fistula with extensive ramifications. Another 8-week old child with rather typical clinical findings was found to have multiple intra- and extracardiac anomalies producing the signs and symptoms. Eighty-two of the ductus were divided and closed; the remaining 7 were in seriously ill infants and were doubly or triply ligated in continuity in the interest of minimizing surgical manipulations. To date, no recurrences are known and all patients survived.

Coarctation of the Aorta

Patients	52
Mortality	0
Ages	8 months to 38 years
Complicated	6

This congenital abnormality is seen predominantly in males. The etiology may be related to an extension of the normal closure and fibrosis of the ductus arteriosus with distal involvement of the aortic wall (Skodaic theory). This commonly occurs with other congenital left heart abnormalities, such as mitral stenosis, subaortic and aortic stenosis, bicuspid aortic valve and also with a rare condition known as Turner's syndrome. In the last condition, there is evidence that the ovarian agenesis is associated with chromosomal abnormalities of the male type. Patent ductus arteriosus often occurs with coarctation.

In this series, 6 cases were associated with one or more of the above noted lesions. The presence of a probe patent ductus is not included since it is hemodynamically insignificant. Six additional cases had mild hypoplasia of the aortic arch proximal to the left subclavian artery. Not included in these 32 cases are 2 cases of pseudocoarctation of the aorta, i.e., constriction of the cross sectional diameter of the aortic isthmus to approximately 50% resulting in no pressure differential, no collateral vessel development, and associated with distal thoracic aneurysm. These cases are included under "Miscellaneous."

The classical physiology of coarctation is that of brachiocephalic hypertension in young patients. Differential arm and leg pulses and pressures as well as the presence or absence of collaterals depend upon the severity of the lesion. The patients are acyanotic in the absence of heart failure, may

have severe recurrent headaches and may complain of claudication in the legs. If a patent ductus communicates with the lower aortic segment (infantile type), the lower extremities may be cyanotic. One case in this series associated with congenital mitral stenosis was this type.

Physical examination confirms the pressure differential and lower extremity pulse lag. The usual murmur associated with this lesion is a pansystolic murmur heard best in the left interscapular region. Laboratory studies are normal and X rays may show normal cardiac configuration, absent or double aortic knob, and left heart enlargement. Angiocardiograms will delineate the lesion accurately. If collaterals are well developed, notching of the ribs is evident. Electrocardiograms show right ventricular preponderance in infants and left ventricular dominance in adults.

If untreated, 75% of patients with this lesion may die before the age of 40, usually from cerebrovascular accidents, aortic or intercostal rupture, or uncontrollable myocardial failure.

Surgery is indicated in infants under one year of age if severe cardiac failure is not controlled by medical management; otherwise, the ideal age is from 9 to 12 years. At any time, the occurrence of progressive symptoms or progression of left heart strain by electrocardiogram may indicate surgical correction. In this series, end to end anastomosis was performed in 45 cases and graft replacement in 7.

Mitral Stenosis

Patients	187
Mortality	4.2%
Ages	17 years to 59 years

All but one of the entire series was treated by closed digital commissurotomy and includes 17 cases of recurrent or residual mitral stenosis previously operated upon elsewhere. One case of mitral stenosis, previously operated upon at this activity, was done by open method. Included under "Miscellaneous" procedures are 5 cases of mitral insufficiency operated upon with the aid of extra corporeal circulation. Many of the 187 cases of predominant stenosis showed evidence of moderate insufficiency and evidence of rheumatic aortic valvulitis.

This is a disease of women; approximately 80% had a history of rheumatic fever. Obstruction to diastolic flow at the mitral level due to fusion and calcification of the commissures and fixed cardiac output is the fundamental patho-physiology. The patients represented here have a long history of progressive exercise intolerance, dyspnea on exertion, orthopnea, hemoptysis, and palpitations. Evidence of severe cardiac damage was present in those with atrial fibrillation or flutter, and the incidence of embolic phenomena in this group was higher. Auscultation in the "classical" case revealed a loud mitral opening snap, a diastolic rumble ending in presystolic accentuation, and often, the diastolic murmur of pulmonic insufficiency. A diastolic mitral thrill was often present. X rays showed enlargement of the left atrium,

fullness of the pulmonary artery shadow, pulmonary venous engorgement, and usually, small ventricles.

Electrocardiograms in the majority of these patients revealed auricular fibrillation. The electric axis had a tendency to be somewhat more to the right than would be expected for the patient's age, although in patients of this series, definite evidence of right ventricular hypertrophy was rare. In those instances in which there was still normal sinus rhythm, the P wave was usually abnormal in the configuration suggestive of left atrial enlargement. Left and right heart catheterization was performed in all cases complicated by mitral insufficiency or other valvular involvement.

Surgical indications were the clinical evidence of the anatomic lesion, accompanied by progressively more severe symptomatology. Contraindications were the presence of active rheumatic involvement, bacterial endocarditis, and severe uncontrolled pulmonic hypertension in older aged patients. Occurrence of cardiac arrhythmias and emboli were believed to represent more urgent indications for surgery.

Mural or calcific emboli were believed to be the cause of death in 3 of the 8 patients who died and upon whom no autopsy was obtained. One patient aged 30 experienced refractory cardiac arrest with complete opening of the mitral valve confirmed at autopsy.

Peripheral Vascular Cases

Patients	95
Mortality	8 to 8.4%
Ages	19 to 77 years

Included under this heading are all lesions of the vascular tree exclusive of the thorax. True aneurysms in this series were entirely secondary to arteriosclerotic degeneration and false aneurysms most often due to trauma. Several patients had multiple aneurysms excised. Occlusive vascular disease also on an atherosclerotic basis is included. Omitted are several instances of reoperation in the postoperative period for removal of thrombi at the site of arterial repair or graft procedures.

Traumatic arterial vascular lesions usually result in false aneurysm formation if the integrity of the media is violated and early surgical repair not performed. This lesion is aptly described as a pulsating hematoma and is often secondary to penetrating injury. The false sac is thin walled, develops thrombi, and compresses adjacent structures. The threat of rupture or embolization is ever present. Often the sac ruptures into an adjacent vein, producing an arteriovenous fistula with its serious sequelae.

True aneurysms due to medial degeneration occurred most often in the abdominal aorta and popliteal areas. Fusiform in shape, they threaten life by rupture and limbs by distal embolization.

Occlusive diseases in this series were seen in the abdominal aorta, in the renal, iliac, and femoral arteries, and were due both to trauma and to atherosclerosis.

Diagnosis of this group of lesions is usually adequate by clinical examination alone. A history of trauma needs no further explanation. Symptoms depend upon the progression of expansion of aneurysms. Occlusive diseases produce symptoms by distal ischemic changes depending upon the adequacy of collateral circulation. Measurement of blood pressures and pulses will clarify the location and extent of the lesion. X rays and angiograms are important ancillary procedures and are used where indicated. Surgery is necessary for the patient who has an aneurysm once its presence has been established. Contraindications include serious visceral disease elsewhere, such as coronary artery or renal disease. The patient must understand that treatment is directed toward a localized area of systemic disease. Early surgical repair of vascular injuries is indicated if false aneurysms and arteriovenous fistulae are to be prevented. Recommendations for surgery in occlusive diseases must be guarded and the surgeon must avoid cases with inadequate distal vascular channels. Ideal situations include the segmental obstructions with good collateral and distal flow.

Where possible, the aneurysmal segment should be resected and replaced by a graft. In this group, one aneurysm was wired and one wrapped with reactive cellophane early in the series. All others were resected and grafted. Endarterectomy may be indicated in selected cases of occlusive disease. The deaths in this series occurred in elderly patients and were due to coronary insufficiency during surgery or to renal insufficiency in the early postoperative period.

(To be continued)

Contributions of Chemistry in Naval Medicine

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A survey of contributions of the Division of Chemistry during the past 20 years since the establishment of the Naval Medical Research Institute, reflects both the needs of the Naval service and the professional backgrounds and training of its staff drawn from medical schools, research institutes, and hospitals. Being essentially chemists, they have been able to span a wide range of technics in analytical and physical chemistry in the study of reactions which take place, and the mechanisms involved in the physiology of man's reaction to his environment. Particular attention has been paid to conditions encountered in military service.

The following is a brief summary of highlights in the form of salient or more significant aspects of the work which has occupied the attention of this one division at NMRI. Lack of space will not permit a listing or more

* Dr. Sendroy is the Chief Chemist and Head of the Division of Chemistry, U. S. Naval Medical Research Institute, National Naval Medical Center, Bethesda 14, Md.

detailed mention of the many and varied problems studied. Furthermore, in the course of compliance with the mission of the Naval Medical Research Institute, some of the effort in supplying vital information for the needs of the service and in the training of personnel in technics and approaches used in research has not been recorded or recounted in the form of publications or verbal presentations. The natural advantages of NMRI's close and continuing relationship with the Navy Department and the naval service at large are reflected in activities of the Division of Chemistry, such as feasibility studies and analytical control and evaluation work which have directly supported the operations of fleet personnel on shipboard or ashore.

Among the earliest problems facing this group were those concerned with the maintenance of water and salt balance under conditions of stress, particularly in field operations. The prime need of a method of converting sea water to drinking water for the survival of shipwrecked personnel on life rafts was successfully met by a single practical method whereby a small chemical kit was used to supply a volume of potable water about six times that of the apparatus used. The present day military specification for the official Desalter Kit, Model 2, is practically that established by NMRI experiments and is mandatory for use by the Departments of the Army, the Navy, and the Air Force.

A method of coating salt pills, so that gastrointestinal symptoms would be avoided, was developed for use in hot environments.

More recently, a simple lyophilization (freeze-drying) method, highly efficient and practical, has been developed for the reclamation of water from urine for the use of personnel in space vehicles. Of the water originally present in voided urine, 99% is recovered in chemically pure form. This first successfully demonstrated method is still a top contender for development and use in outer space.

The Division has initiated or participated in a continuing program of research on the effect of atmospheric changes on blood chemistry associated with physiologic function. Numerous studies have been made of the effect of carbon monoxide on the capacity of the blood to transport oxygen under conditions prevailing when personnel work in hangar spaces, gun turrets, missile firing sites, submarines (with motor burnouts), and at high altitudes. Knowledge of the toxicity of other gases and vapors generated and/or encountered in military operations has also been advanced; steps have been taken to effect odor control.

As a parallel effort, there has been continuing work on the effect of oxygen lack in body tissue, whether caused by exercise or the rarified atmosphere of high altitudes. Studies have been made of the oxygen debt tolerance to hypoxia under such conditions simulated in a low-pressure chamber. Observations have been made of the acid-base balance abnormalities resulting from respiratory and metabolic disturbances. Pressure breathing at altitude, tolerance to carbon dioxide, and improvements in denitrogenation as a consequence of decompression from pressure (as in diving) or from sea level (as in aviation) have been tested. Members of the Chemistry Division have participated independently or in collaboration with physiologists in the solution of

problems in respect to supply and logistics, and the deployment of personnel, space, and material. Such studies have involved the development of methods for and studies of body characteristics (volume, surface area, specific gravity) and composition (fat, water, and lean body mass). These have contributed toward the acceptance of lean body mass as a much more valid and reliable appraisal of physical fitness than weight.

A diagram and nomogram for obtaining human body surface area from height and weight were developed by graphic methods. These contributions have been incorporated in the latest biologic handbooks and in many texts and monographs covering various phases of biology and physiology. The measurement of body surface area has been correlated by other investigators with many other biologic and physiologic variables and indices, such as development and growth, oxygen consumption, basal metabolism, body heat production, lung carbon monoxide diffusing capacity, extracellular body fluid, lean body mass, and body volume. It has been applied with varying degrees of success in the treatment of burn cases and radiation effects, for the assessment of drug dosage and body covering, and in the approach to aircraft engineering design by studies of the relationship of aircrew movement and performance in limited spaces.

Preceding and paralleling practical work, supporting fundamental studies have usually been carried out. The solubility of gases in biologic fluids, their equilibria within physiologic systems, and the physicochemical properties of body fluids and tissues have been studied. Other studies have included the electrophysical properties of proteins and kinetics of amino acid metabolism. There have been continuing study and development of new methods of quantitative analysis—or the modification and improvement of ones already established—as tools for further chemical, physical, and clinical investigations. Studies have been made of the analyses of carbon monoxide, iron carbonyl, sulfurhexafluoride, chloride, pH, and proteins; many processes have been employed, such as gravimetric, gasometric, titrimetric, spectrophotometric, areametric, electrometric, and electrophoretic technics.

Adaptability and versatility characterize the efforts and results of the staff of the Division of Chemistry at NMRI as they devise new technics for studying the biology of man through physiologic chemistry in fundamental and applied studies.

Monographs of Infectious and Tropical Diseases

By Preventive Medicine Division, BuMed

A description of the monographs on infectious and tropical diseases of the Technical Information Manual for Medical Corps Officers, NAVMED P-5052 series, first appeared in the U. S. Navy Medical News Letter, Vol. 37, No. 10, pages 35-36 of 19 May 1961. Accordingly, BUMED INSTRUCTION 5604. 1D of 25 May 1963 will be revised. The following changes to chapters of this manual have been published and distributed to ships and stations having Medical Corps officers regularly assigned:

NAVMED No.	Title and Description	
- 1A	Filiarial Infections of Man	Revised 2 Mar 1962
- 5-CH-1	Etiology, Prevention, Diagnosis, and Treatment of Adverse Effects of Heat	CH-1 of 26 Nov 1957
- 6A	Schistosomiasis	Revised 20 June 1962
- 6A-CH-1		CH-1 of 26 Sep 1962
- 15A	Immunization	Revised 5 Sep 1962

Later chapters, already distributed, which will be listed and described in the revision of the Instruction are as follows. Others may be expected from time to time.

- 20 Prevention of Spread of Tuberculosis in Armed Forces Hospitals .. 31 Aug 1961

 Provides information concerning the essential requirements for the prevention and reduction of the spread of tuberculosis in Armed Forces hospitals. Prophylactic measures for hospital personnel are included.

- 21 Scrub Typhus (Mite-Borne Fever, Tsutsugamushi Disease) Published 28 June 1962

 Describes the diagnosis and treatment of scrub typhus and the natural history and epidemiology of the disease. Gives detailed instructions for prevention of the disease in individuals and groups of persons at risk; of special interest to Marines.

- 22 Sandfly (Pappataci, Phlebotomus) Fever Published 29 Dec 1961

 Describes the clinical and laboratory features and prevention of sandfly fever. Discusses the ecologic relationships of the etiologic agent, vector, and the human host.

- 23 Cholera Published 28 June 1962

 Describes the clinical course, diagnosis, treatment, and prevention of cholera. Of special importance is information, including laboratory tests, detailing simple rapid and effective methods of treatment.

NOTE: Reference is made to the article on "Cholera - Physiological Alterations and Their Correction," by CAPT Robert A. Phillips MC USN and CDR Raymond H. Watten MC USN, which appeared in the U. S. Navy Medical

News Letter, Vol. 39, No. 9, pages 3 - 9, 4 May 1962. The report covers important developments emanating from NAMRU-2 which have advanced the treatment of cholera beyond any methods used previously. It is a fine contribution to modern medicine and the literature. —Editor

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MISCELLANY

Announcement of Aerospace Medical Courses

Course	Class	Inclusive Dates	Deadline Date to Apply	Quota
Medical Support for Missile Operations	63-C	23 Sep - 4 Oct 1963	15 Aug 1963	2
	63-D	2 Dec - 13 Dec 1963	18 Sep 1963	3
	64-A	2 Mar - 13 Mar 1964	14 Dec 1963	3
	64-B	27 Apr - 8 May 1964	10 Feb 1964	2
Medical Support for Space Flight	63-B	7 Oct - 1 Nov 1963	15 Aug 1963	6

The above scheduled courses will be conducted by the U. S. Air Force Medical Service at the School of Aerospace Medicine, Brooks Air Force Base, Texas. SECRET security clearance is required on all candidates approved for attendance.

The presentation of Medical Support for Missile Operations is designed to provide selected officers of the Medical Services of the Armed Forces of the United States with essential fundamental knowledge for the organization and implementation of a medical support program at a missile site. Instruction is presented to familiarize the graduate with operational weapons systems and with the various toxic substances and hazardous conditions associated with missile operations. A field trip is an integral part of this course.

The purpose of the course, Medical Support for Space Flight, is to familiarize selected physicians of the Departments of the Army, Navy, and Air Force with the physical and chemical aspects of the upper atmosphere and space, and the biomedical impact of these factors on man, and to permit active participation in medical support of future man-in-space programs. Prerequisites include: (1) Must be a Regular or Career Reserve Medical Officer: (2) Must have satisfactorily completed the course in Aerospace Medicine, Primary, as conducted by the United States Air Force, or the Basic Course for Flight Surgeons as conducted by the United States Navy; (3) Must be

actively engaged in the teaching or practice of aviation medicine or conducting aeromedical research. A five-day field trip to a missile range is an integral part of this course and clothing suitable for flying will be needed. Requests should be forwarded in accordance with BUMED INSTRUCTION 1520.8 and comply with the deadline date as indicated above. All requests must indicate that a security clearance of SECRET has been granted to the officer requesting attendance. —Training Branch, Professional Div, BuMed

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Postirradiation Treatment of Lethal Total Body Irradiation by Cell-Free Spleen Extracts

Friedrich P. Ellinger MD*, (Amer J Roentgenol 87: 547-554, 1962). Summaries of Research, NMRI, 1962.

1. Postirradiation treatment with homologous as well as heterologous cell-free spleen extracts in appropriate doses reduces radiation mortality (e.g., in guinea pigs the $LD_{75-80/20}$ is lowered to the $LD_{40/20}$).
2. This result can be obtained with treatment started after irradiation (during the latent period) when most chemicals fail to reduce mortality.
3. Treatment with cell-free spleen extracts is free from unpleasant side and deleterious late effects. Animals treated with such preparations gain weight and retain such weight gain until death.
4. Postirradiation treatment with cell-free spleen extracts avoids the inherent drawbacks of preirradiation treatment with chemicals.
5. Cell-free spleen extracts are effective if administered intramuscularly. This fact recommends them as a treatment method in emergencies because self-administration by a patient or administration by untrained personnel would be possible, if and when these extracts are used in human beings.
6. Cell-free spleen extracts can be produced in quantity, in view of the fact that homologous as well as heterologous extracts can be used. In this respect they are superior to the bone marrow grafts since the use of the individual's own bone marrow appears necessary.
7. Cell-free spleen extracts can be stored for approximately one year without notable loss of activity. This represents another advantage over bone marrow, inasmuch as storage of viable bone marrow cells without loss of protective properties over longer periods of time is still a formidable technical problem.

* Deceased. Formerly Head of Pharmacology and Radiation Biology Division, Naval Medical Research Institute, NNMC, Bethesda, Md.

8. Treatment with cell-free spleen extracts restores spleen and bone marrow. This proves the superiority of cell-free spleen extracts over marrow grafts also from the functional point of view. Homografts of bone marrow restore bone marrow function by repopulating it, "but spleen and lymph nodes show little evidence of return to normal."

9. From the foregoing it appears that postirradiation treatment with cell-free spleen extracts appears to be the most practical and successful approach to the therapy of lethal total body irradiation so far developed by animal experimentation.

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Navy Psychiatric Assessment Program in the Antarctic

J. E. Nardini, R. S. Herrmann, and J. E. Rasmussen. Amer J Psychiat 119: 97-105, 1962.

The Navy program for psychiatric assessment of personnel wintering over in the Antarctic is described in this article. During the 5-year history of the assessment program, there have been no documented cases of psychotic illness. Six men have been admitted to the sick list for psychiatric reasons, only one of whom had been through the assessment procedure. This case was diagnosed as a personality disorder. Thus, it would appear that the program has been effective in identifying and eliminating individuals who will develop serious or incapaciting emotional illnesses under the stress of isolation.

An analysis of data relating to performance effectiveness in the Antarctic shows that there is a significant positive correlation between the psychiatric prediction and subsequent performance. However, because of several limitations in the data, results in this aspect of the study should be interpreted with caution.

Certain shifts have occurred in the assessment criteria during the past 5 years. The most important variable in adjustment to Antarctic isolation now is considered to be vocational effectiveness. The structure and composition of the small isolated group is next in importance. Except for extreme rigidity, there are no neurotic mechanisms which are considered, per se, to be disqualifying. However, personality disorders do constitute a rather serious problem.

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BUMED INSTR CTION 6120.3E. This instruction establishes procedures and reporting methods for conducting and processing formal physical examinations of candidates for admission to the U. S. Naval Academy. BUMED INSTRUCTION 6120.3D is canceled. The provisions of ManMed art 15-43 are unchanged.

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FROM THE NOTE BOOK

Federal Hospital Luncheon

The Federal Hospital Executives Luncheon is sponsored this year by the U. S. Air Force. It will be held on Tuesday, 27 August 1963, at 12:15 p. m. in the Grand Ballroom of the New York Hilton Hotel, New York City, during the annual convention of the American Hospital Asociation. General Curtis E. LeMay, Chief of Staff, U. S. Air Force, will be the guest speaker.

The Committee on Federal Medical Services arranges for the annual Federal Hospital Executives Luncheon and coordinates a Federal Hospital Exhibit at the annual meeting of the Association. The Committee is composed of representatives of the Army, Navy, Air Force, Public Health Service, Veterans Administration, and the Bureau of the Budget. The Committee advises the Council on Government Relations and acts to enhance coordination between Federal Service and civilian hospitals throughout the country.

Tickets for the luncheon are $5.00 per person and may be obtained from CDR D. D. Moore MSC USN, Code 31A, Ext 61834, Bureau of Medicine and Surgery, Navy Department, Washington 25, D. C. Checks or money orders should be made payable to the American Hospital Association. It is requested that tickets be purchased prior to 15 August 1963.

—Professional Division, BuMed

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Naval Medical Librarians Attend International Meeting

The following Naval Medical Librarians attended the Second International Congress on Medical Librarianship at the Shoreham Hotel, Washington, D. C., during the week of 16 - 22 June 1963:

Miss Beverly Bernier	Naval Medical Research Institue, Bethesda, Md.
Miss Elizabeth Dennis	U. S. Naval Hospital, Chelsea, Mass.
Miss Mary A. Dixon	Naval Medical School, Bethesda, Md.
Mrs. Madge Goolsby	Naval Medical School, Bethesda, Md.
Miss Genevieve Griffin	Naval Medical School, Bethe da, Md.
Miss Sherrill McMillan	U. S. Naval Hospital, San Di o, Calif.
Mrs. Mildred Mooreland	Naval Medical Research Inst ıte, Bethesda, Md.
Mrs. Catherine O'Connell	Surgeon General's Library, ashington, D. C.
Mrs. Frances Player	U. S. Naval Hospital, Portsı uth, Va.
Mrs. Thelma Robinson	Naval Medical Research Ins ute, Bethesda, Md.
Miss Gary Turner	Naval Medical School, Beth da, Md.

A picnic was held at Stone Lake, National Naval Medi enter, for about 1200 medical librarians from many nations and their ts. This was one of the social highlights of the Congress.

Tribute to Miss Fuller at Philadelphia

Roberta J. Fuller Hospitalman (W) USN, current "Miss Armed Forces" for the Philadelphia area, on 3 July 1963, was made an honorary crew member of the USS WILLIAM M. WOOD. The USS WOOD, an Atlantic Fleet Destroyer, which was selected as one of the most "squared away" ships in the Fleet, was on display over the Fourth of July for public viewing. Miss Fuller was piped aboard and also made an honorary Destroyer man-of-wars man. She was given a detailed tour of the ship which was completed by meeting the Commanding Officer, CDR Emory P. Smith USN.

Miss Fuller enlisted in the Naval Service on 6 July 1961 following graduation from the North Des Moines High School, Iowa. She attended "Boot Camp" in Bainbridge, Md., and Hospital Corps School in Great Lakes, Ill. She choose Neuropsychiatric Technician's School upon arrival at USNH Philadelphia and graduated on 7 September 1962. Miss Fuller is now assigned to ward T-9, the Sick Officer's Quarters and Dependents' Psychiatric Ward.

—PIO, USNH, Philadelphia, Penna.

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Naval Medical Research Reports

U. S. Naval Medical Research Unit No. 2, APO 63, San Francisco, Calif.

1. Summaries of Research, July - December 1962.
2. Non-Anopheline Mosquitoes of Taiwan: Annotated Catalog and Bibliography: MR 005.09-1406.1.1, October 1962.
3. Bionomics of Japanese Encephalitis Virus in Taiwan: Lecture and Review Series Report No. 62-5, October 1962.
4. Haptoglobin Type Determination by Cellulose Acetate Zone Electrophoresis: MR 005.09-1601.7.3, November 1962.
5. Asymptomatic Wilson's Disease: MR 005.09-1901.2.3, November 1962.
6. Diagnostic Procedures for the Newer Respiratory Disease Viruses: Lecture and Review Series Report No. 62-6, December 1962.
7. Preliminary Survey of Intestinal Parasites in Aborigine Village in Southeast Taiwan (Formosa): MR 005.09-1601.3.12, January 1963.
8. DL-Penicillamine as a Cause of Optic Axial Neuritis: MR 005.09-1901.2.5, January 1963.
9. Isolation and Characterization of a New Influenza Type B Virus on Taiwan: MR 005.09-1201.4.7, April 1963.
10. Studies on the Genus Kalicephalus (Nematoda: Diaphanocephalidae) II. A Taxonomic Revision of the Genus Kalicephalus Molin, 1861: MR 005.09-1601.3.14, May 1963.

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DENTAL SECTION

The Table Clinic
Person-to-Person Teaching*

Louis I. Grossman, D.D.S., Dr. med. dent., Professor of Oral Medicine, School of Dentistry, University of Pennsylvania. Dental Progress 3(4):267-270, July 1963.

"A loud voice is not the only requisite for a good table clinic," according to Dr. L. I. Grossman. An experienced teacher and researcher, Grossman explains in his article that the successful table clinic depends primarily on two things: new, useful information--presented in an original, interesting manner. In a concise discussion of the latter, the author provides important tips and illustrations on how to make maximum use of charts, display models, lantern slides, motion-picture films, apparatus, special equipment and instruments, the manikin, and mimeographed sheets. Be he teacher, researcher, or student, the reader will find this article an interesting and informative guide to the planning and conduct of the postgraduate table clinic.

*An abstract of the article.

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The Use of Disclosing Agents for Measuring Tooth Cleanliness

Sumter S. Arnim, B.A., D.D.S., PhD., Professor of Pathology, Director, Postgraduate School of Dentistry, The University of Texas Dental Branch, Houston, Texas. J Periodont 34(3): 227-245, May 1963.

This report includes a presentation of methods derived and results obtained when disclosing agents were used to measure the effect of a variety of procedures for cleansing the teeth. The study began 14 years ago. More than 800 students, faculty members and patients have participated. Microcosms (bacterial plaques) were stained with disclosing agents; then records were made photographically and diagrammatically of their presence and location. The teeth were cleansed, the disclosing agent was reapplied and records were made again. By comparing the first set of records with the second, an estimate of the effectiveness of the cleansing procedure was obtained.

Many disclosing solutions were evaluated and discarded during the 12 years of study. All were messy, some were suspected carcinogens, and none

was truly practical for home and office use. To overcome these disadvantages, several wafers* were made and tested clinically. The final outcome was a method for measuring tooth cleanliness which was more practical, less time consuming and more popular than any we had used before. The idea of the wafer test was appealing to dentists, teachers and patients.

Many people found the tablets to be useful aids for learning effective and thorough cleaning habits. These perceptive individuals cleaned their mouths so well that check up tests with disclosing agents revealed no colonies of microbial matter adhering to their teeth. They also arrested or controlled their periodontal disease and dental caries.

The most important outcome of this study is the knowledge that disclosing agents are useful for determining accurately the cleanliness status of individual tooth surfaces at a specific time in any mouth. This information may be used by anyone who wants to know whether a given instrument or method or combination thereof will clean teeth thoroughly. It provides every dentist with an accurate scientific test that he can use in his own office for measuring the effect of any hygienic agent on the dental microcosms adhering to the teeth of his patients. In addition, the results obtained by testing are useful to the patient as aids for learning how to use the instruments and methods for cleaning teeth most effectively. Those who learn to clean thoroughly, and do so regularly, prevent dental disease and preserve oral health.

*The procurement source of wafers is referred to in the original article.

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Personnel and Professional Notes

Article by Cdr Alexander DC USN. Medical News Letter, Vol. 42, No. 1, of 5 July 1963, contained a condensed version of the article by Cdr Perry C. Alexander, DC, USN published in the Journal of Prosthetic Dentistry 13(2):309-317, March-April 1963, entitled "Analysis of the Cuspid Protective Occlusion." This condensed version was printed to stimulate attention to this well-prepared analysis of occlusion. All dental officers are urged to study the original article.

Artificial Teeth, Tooth Facings and Backings. Copies of the DOD Negotiated Contracts for the procurement of artificial teeth, tooth facings and backings have been mailed to all dental activities having authorized dental prosthetic laboratory facilities. A total of six contracts were included in the mailing and involve the following companies:

The Dentist Supply Company of New York
H. D. Justi and Son
Universal Dental Company
Myerson Tooth Corporation
Kenson Manufacturing Corporation
The Columbus Dental Manufacturing Company

(Continued on page 26)



RAdm Schantz Retires

RAdm Curtiss W. Schantz was placed on the retired list of the Navy on 1 Aug 1963, after more than 37 years of continuous service as a Regular and Reserve Commissioned Officer. He has served since 1 Nov 1958 as Asst. Chief of the Bureau of Medicine and Surgery (Dentistry) and Chief, Dental Division.

RAdm Schantz received his DDS degree in 1925 from Marquette University. During 1946-1951, he headed the Naval Dental Corps' largest clinical facility where he established the present Dental Research Facility and the first SecNav designated Naval Dental Technicians' School. As Commanding Officer of the U. S. Naval Dental School (1954-1958) he pioneered professional correspondence courses and sponsored important research studies. One major research contribution to the dental profession during this period was the development of the first air-turbine handpiece, which resides today at the Smithsonian Institution.

RAdm Kyes Takes Over Naval Dental Corps



RAdm Frank M. Kyes was appointed by the Surgeon General to the office of Asst. Chief of the Bureau of Medicine and Surgery (Dentistry), and Chief, Dental Division effective 1 Aug 1963. RAdm Kyes relieved RAdm C. W. Schantz.

While on the staff of the U. S. N. Dental School (1948-1952) he served as Head of the Prosthetic Dentistry Department. During this period he also had charge of the rapidly expanding Training Aids Section of the Naval Dental School. As the Senior Dental Officer, U. S. Naval Academy (1954-58) he conducted an extensive research study of the effects of stannous fluoride dentifrices on midshipmen. From 1959 to 1961, he headed the Dental Department, U. S. N. Training Center, Great Lakes, Illinois, and subsequently, served as Director of Dental Activities in the Ninth Naval District. On 1 March 1963, RAdm Kyes became Inspector General, Dental.

Admiral Kyes received his DDS degree from the University of Southern California in 1930. He is a Diplomate of the American Board of Prosthodontics and is widely recognized as a lecturer and contributor to the dental literature.



Capt Raffetto Promoted to RAdm

Capt Edward C. Raffetto DC USN was promoted to the rank of Rear Admiral and designated Inspector General, Dental, on 1 August 1963.

RAdm Raffetto received his DDS degree from the University of Pennsylvania in 1935 and interned in the USPHS, Marine Hospital, Boston, Mass., until 1936.

Upon being commissioned a Lt(jg) in the Naval Dental Corps in 1936, Dr. Raffetto reported to the USNH Chelsea, Mass. During World War II, he saw action in the Gilbert and Marshall Islands campaigns. As result of his service aboard the USS Repose, he became entitled to wear the Korean Service Medal with three engagement stars.

Prior to being selected to the rank of Rear Admiral and being appointed Inspector General, Dental, he served as Head, Personnel Branch in the Dental Division.

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U. S. Naval Dental Corps Continuing Training Program

The U. S. Naval Dental School, Bethesda, Md., begins the series of short postgraduate courses for Fiscal Year 1964 with the course "Endodontics" to be presented 16-20 September 1963. The instructor will be Capt J. F. Bucher.

This course consists of lectures, seminars, and demonstrations of endodontic procedures that may be undertaken at any dental activity. Included are discussions on the etiology, diagnosis, and treatment of diseases of the dental pulp, conservative and surgical management of periapical lesions, and management of situations related to other fields of clinical dentistry. Quotas have been assigned to ComThree, ComFive, ComSix, ComNine, and PRNC. When districts who have quotas assigned do not fill the quota 4 weeks prior to the commencement of the course, the quota may be assigned to personnel from other areas who may have applied.

These short courses are open to active duty career Dental officers of the Armed Forces in accordance with quotas established by the Bureau of Medicine and Surgery.

The Bureau Professional Advisory Board will make recommendations on all requests, and upon approval by the Surgeon General, applicants will be notified regarding final action. Those approved will be nominated for TAD or authorization orders, as appropriate. Staff Dental Officers not utilizing assigned quotas must report this information to BUMED, Code 6111, at least 4 weeks prior to the convening date of the course.

These contracts cover the period from 1 July 1963 to 30 June 1964. Requests for additional copies or information pertaining to these contracts should be addressed to Chief, Field Branch, Bureau of Medicine and Surgery, 3rd Avenue and 29th Street, Brooklyn 32, New York.

Revised Qualifications Manual Distributed. A revised Manual of Qualifications for Advancement in Rating, NavPers 18068A, June 1963 is being distributed by the Chief of Naval Personnel. This document contains a complete revision of the dental section of the manual. Among the more important portions of the manual for dental personnel are:

Page 11: Effective dates for Advancement Examinations
Page 26: Performance Test Instructions
Page 29: Military Requirements
Page 0-9: General Rates (DN)
Page 11-1: Group XI, Dental
Page A-94: (Appendix) Correlation Table

Revised Dental Technician Manual. The revised Navy Training Course, Dental Technician, Prosthetic, NavPers 10685-B is now available through normal supply channels. This revised manual is intended to serve as a reference text for classroom study, as a guide for the performance of prosthetic laboratory procedures, as a ready reference for personnel studying for advancement in rating, and as a means to increase the knowledge of the dental technician, thereby increasing the capabilities of the dentist. This will enable the dentist to concentrate on the more professional services for the patient.

Personal copies of this manual are available from the Superintendent of Documents, U. S. Government Printing Office, Washington, D. C., at $2.50 per copy.

Enlisted Graduation Exercises, U. S. Naval Dental School. Certificates for successful completion of advanced and specialized courses of instruction were presented to 41 dental technicians at graduation exercises held on 21 June at the U. S. Naval Dental School, NNMC, Bethesda, Md.

"The Role of the Dental Technician in Support of the Operating Forces of the Marine Corps" was the theme of an address to the graduates by Captain John V. Niiranen DC USN, Staff Dental Officer, Headquarters, U. S. Marine Corps.

Captain A. R. Frechette DC USN, Commanding Officer of the Dental School, presented letters of commendation to the students having the highest averages in their respective fields of dental technology: Arthur E. Kennedy, DT1, Advanced General; Leo P. Thibeault, DT1, Advanced Prosthetic; and Paul A. Parenti, DT2, Basic Repair.

Jerome D. Harrison, DTC, received the seventh Thomas Andrew Christensen Award in recognition of his excellent service record and service reputation. The award, which was established by the Naval Dental School to honor the only dentalman presented the Navy Cross posthumously for extraordinary heroism, is granted to an outstanding graduate of an enlisted course.

PREVENTIVE MEDICINE

Analysis of 460 Fatalities from Venomous Animals in the United States

Henry M. Parrish, M.D., Dr. P.H., Associate Professor of Community Health and Medical Practice, University of Missouri School of Medicine, Columbia, Missouri. Amer J Med Sci 245(2), No. 1090: 35/129 - 47/141, February 1963.

Venomous animals are found in every state of the continental United States. These include venomous snakes, lizards (Gila monster), toads, spiders, scorpions, centipedes, millipedes, caterpillars and Hymenoptera insects (bees, wasps, yellow jackets, hornets, ants). Among venomous marine animals are jellyfish, stingrays, sculpins, hydroids, sponges, segmented worms, echinoderms, mollusks, and venomous fishes (Essex 1945, Halstead 1958, Russell 1961). Some of these animals are more injurious to human beings than are others. Therefore, it seemed worthwhile to discover what venomous animals in the United States cause human fatalities.

Venomous animals throughout the world cause more human deaths than most people suppose. It has been estimated that venomous snakes alone cause 30,000 to 40,000 deaths each year throughout the world (Swaroop and Grab 1954). A preliminary study (Parrish 1959) showed that there were 215 deaths from bites and stings by venomous animals in the United States from 1950 through 1954. This provided an average of 43 deaths per year, and an average death rate of 0.28 per 1,000,000 population per year. The present study is a 5-year extension of the data in the preliminary study.

The purpose of this study is to analyze fatalities in the United States caused by venomous animals for the 10-year period, 1950 through 1959. There are very few studies which provide incidence rates, by state and region, for accidents resulting from bites and stings by venomous animals. Therefore, an analysis of fatal cases is used to measure the magnitude of this problem, to chart the geographical distribution of fatal cases, and to ascertain additional medical and epidemiological facts about these deaths.

Methods. Deaths due to, "accidents caused by bites and stings of venomous animals and insects," are grouped together under Category E927 in the "International Statistical Classification of Diseases, Injuries and Causes of Death." A list of Category E927 death certificates for the 10-year period, 1950 through 1959, was obtained from the National Office of Vital Statistics,

U. S. Public Health Service, Washington, D. C. This list included the death certificate file number, the date of death, and the State in which death occurred. The State Health Officers of the various States in which these deaths occurred were requested to supply photocopies of the original death certificates. There was a 100% response to this request.

The death certificates provided the following information: the cause of death; the age, race, sex and occupation of the victim; the town, county and state where the accident occurred; the day, month and year of death; the kind of venomous animal inflicting the injury; in most instances, the place where the accident took place (farm, home, and others); and the interval of time between the injury and death.

Venomous Animals. From 1950 through 1959 there were 460 deaths in the United States (excluding Alaska and Hawaii) from bites and stings by venomous animals (see Table 1).

Table 1.
Venomous Animals and Insects Responsible for
Fatal Bites and Stings in the United States, 1950-1959

Animal or Insect	Number	Percent
Hymenoptera insects	229	49.8
Bees	124	27.0
Wasps	69	15.0
Yellow jackets	22	4.8
Hornets	10	2.2
Ants	4	0.8
Poisonous snakes	138	30.0
Rattlesnakes	94	20.4
Cottonmouth moccasins	8	1.7
Coral snakes	2	0.4
*Cobras	2	0.4
*Boomslang	1	0.2
Unidentified snakes	31	6.7
Spiders	65	14.1
Scorpions	8	1.7
Coelenterata, unspecified	1	0.2
Stingaree (stingray)	1	0.2
Animal or insect, type unknown	18	3.9
Total	460	99.9

*Snakes which are not indigenous to the United States.

Rattlesnakes (Crotalus sp.) are by far the most deadly snakes in this country. Rattlesnakes killed 94 people, cottonmouth moccasins killed 8 people, and coral snakes killed 2. Three individuals were killed by poisonous snakes which are not native to the United States. A professional snake handler and a night club entertainer were killed by cobras (Naja sp.) and an internationally renowned herpetologist was fatally bitten by an African boomslang. Two people died from bites by brown spiders (Loxosceles reclusus). The remaining spider-bite deaths were attributed to Latrodectus spiders. The following venomous animals did not kill anyone during the 10-year period: Gila monsters, centipedes, millipedes, copperhead moccasins, tarantulas, caterpillars and venomous fishes. While these animals produce toxic venoms, they do not frequently cause human fatalities in the United States.

The 3 most important groups of venomous animals in the United States are Hymenoptera insects, snakes, and spiders. They accounted for 432 (94%) of all fatal venenations. It is an astounding fact that bees kill more people in this country than any other venomous animal, including rattlesnakes. The score: bees 124 deaths versus rattlesnakes 94 deaths. Wasps were the third most deadly venomous animals with 69 deaths, while poisonous spiders ranked fourth with 65 deaths. Because of their small size in relation to the large size of human beings they kill, Hymenoptera insects may be thought of as "giant killers."

Victims. There were 460 human deaths caused by venomous animals in the United States from 1950 through 1959, an average of 46 deaths per year, and an average death rate of 0.28 per 1,000,000 population per year. The number of deaths per year ranged from a low of 35 in 1953 to a high of 61 in 1959. The ratio of female deaths to male deaths was 1 to 2.8. This proved true for both whites and non-whites. That 2.8 times as many males as females were killed by venomous animals reflects the greater exposure of men to these accidents through out-of-doors occupations and recreational habits.

Of 138 snakebite fatalities, 55 (40%) were among young people less than 20 years of age. Twenty-seven (20%) of the victims were less than 5 years of age! Snake venom poisoning is more serious in children than in adults because of the greater ratio of units of venom injected to the units of body weight. Furthermore, children are frequent victims of snakebite accidents (Swartzwelder 1950, and Wood 1954). A study of poisonous snakebites in Florida showed that 49% of all bites occurred in young people less than 20 years of age (Parrish 1957). This reflects the curiosity of children and the fact that most children do not know snakes can be dangerous. Often they were bitten while handling poisonous snakes. Persons 50 years of age and older provided 32% of the fatal snakebite cases.

The age distribution of spider bite victims is similar to that of snakebite victims. Thirty-five percent of fatal spider bites occurred in youths less than 20 years of age and 52% were among persons 50 years of age and older. Published reports (Bogen 1926, 1932, Kirby-Smith 1942, Wilson 1943) indicate that less than 25% of spider bites occur in persons less than 20 years of age.

The age distribution of persons dying from stings by Hymenoptera insects was strikingly different from the age distribution of snakebite and spider

bite victims. Of 229 Hymenoptera deaths, only 17 (7%) were among persons less than 20 years of age; whereas 89% were among those 30 or more years of age. Most of these deaths resulted from insect allergy rather than from the toxic effects of the venom per se (Foubert and Stier 1958, Loveless and Fackler 1956, Mueller 1959).

Time Interval Till Death. It is a common belief that poisonous snakebites are followed by death in a few minutes or within an hour or two. Table 2 shows that only 6 (4%) of 138 snakebite victims died in less than one hour. Indeed, only 23 (17%) died in less than 6 hours. Eighty-eight (64%) of the snake venom poisonings were fatal 6 to 48 hours after the bite. This observation is in keeping with the fact that the venoms of North American pit vipers (rattlesnakes, cottonmouth moccasins and copperheads) are absorbed primarily through the lymphatics and tissue spaces. Usually it takes several hours following a snakebite before the full toxic effects of the venom become evident. Thus, there is a 60- to 120-minute period following most snake venenations when first aid and specific antivenin therapy may be used to best advantage in averting death. Failure to seek prompt and vigorous medical treatment is one of the most important causes of death from snake venom poisoning (Parrish 1957). The two victims of coral snakes died of respiratory paralysis 4 and 5 hours, respectively, following the bites. Coral snake venom is primarily a neurotoxin which produces minimal local signs and symptoms. Frequently there is a delay of an hour or more following a coral snake bite before the neurotoxic effects of the venom become evident.

Table 2.
Interval Between Bite or Sting and Death from
Venomous Animals and Insects, United States, 1950-1959

Interval	Animal or Insect				
	Snakes	Hymenoptera	Spiders	Others	Total
0-1 hour	6	167	1	6	180
2-5 hours	17	24	1	3	45
6-11 hours	27	1	4	4	36
12-18 hours	29	--	3	1	33
19-24 hours	14	--	8	-	22
25-48 hours	18	5	11	2	36
3-7 days	13	6	14	3	36
8-14 days	7	3	8	2	20
15 or more days	2	2	4	1	9
Not stated	5	21	11	6	43
Total	138	229	65	28	460

Hymenoptera insects kill allergic patients with alarming suddenness. Most of these people died suddenly within 15 to 30 minutes, and were seen by physicians only after death. Many of these victims did not have time to summon medical aid, owing to the overpowering effects of laryngeal edema or anaphylactic shock, or both. Physicians certifying these deaths often wrote that the patient died from "shock," "allergy," "anaphylaxis," "laryngeal edema," "heart failure," "coronary occlusion," or "stroke" following a sting or multiple stings by Hymenoptera insects. Approximately 8 deaths resulted from hundreds of insect stings in the same individuals. These deaths resulted from overwhelming envenomation rather than from insect allergy. Of 208 deaths from Hymenoptera stings where the interval of time between the sting and death was known, 167 (80%) died in less than 1 hour and 191 (92%) died within 5 hours following the sting. The following measures are suggested as ways to help prevent these sudden and tragic deaths: (1) Identify and desensitize allergic patients with appropriate insect antigens (Benson and Semenov 1930, Foubert and Stier 1958, Loveless and Fackler 1956, Mueller 1959); (2) Instruct hypersensitive patients to carry insect allergy, first-aid kits with them (Barnard 1957, Thomas 1958); (3) Encourage patients to wear light colored clothing when exposed to the risk of a sting and to use other protective measures suggested by entomologists (Morse and Ghent 1959); and (4) The public should be informed of this potentially life-threatening medical problem by means of health education techniques.

Only 6 (11%) of 54 victims of spider venom poisoning, where the interval of time between the bite and death was stated, died in the first 12 hours. Twenty-two (41%) died 12 to 48 hours after the bite, and 14 (26%) died from the third to the seventh day. The remaining 12 patients expired after the first week following the bite. Black widow spider (Latrodectus sp.) venom is thought to be absorbed into the body by way of the lymphatic system. Usually, some local symptoms are present within the first 2 hours following the bite, but several hours may elapse before the full toxic effects of the venom are experienced. These symptoms may persist from one to 4 days (Baerg 1923, Blair 1934). Two people died from bites by brown spiders (Loxosceles reclusus). A 5-year old child died 24 hours after a brown spider bite and a 74-year old woman died of septicemia 25 days after the onset of necrotic arachnidism.

Eight people died from scorpionism in less than 12 hours following the sting. Two of these deaths were attributed to scorpion venom allergy producing anaphylactic shock. The stingray victim died 3 days after envenomation. The interval between the coelenterate sting and death was not recorded.

Geographical Distribution. Deaths caused by venomous animals were reported from 45 of the 48 states. New Hampshire, North Dakota, and South Dakota did not report any deaths from this cause. The states reporting the highest number of fatalities were Texas (67), Georgia (36), California (32), Florida (26), Alabama (25), North Carolina (21), and Kentucky (20). The average number of deaths per year caused by poisonous snakes, Hymenoptera and poisonous spiders respectively, and the estimated 1955 population for each state and region were used to calculate the average death rates per 1,000,000 population.

The following states reported the largest number of snakebite deaths: Texas (24), Georgia (22), Florida (2), Alabama (14), and California (12). Snakebite deaths were reported from 22 states. However, the highest average death rates from snakebites per 1,000,000 population were found in Arizona (0.63), Georgia (0.60), Florida (0.54), Alabama (0.45), South Carolina (0.31), and Texas (0.27).

The highest average death rates per 1,000,000 population by regions were: South Atlantic (0.24), and East South Central (0.22). These regions have an abundant supply of various species of poisonous snakes, especially deadly rattlesnakes (Stickel 1952). Although no snakebite deaths were reported from the New England and Middle Atlantic regions and from numerous states, this should not be interpreted that poisonous snakebite accidents do not occur there. For example, no deaths were reported for Indiana, Connecticut, or Virginia, but nonfatal poisonous snakebites have been recorded from each of these states (Minton 1950, Parrish, Badgley and Carr 1960, Wood 1954).

Fatal Hymenoptera stings were reported from 40 of the 48 states and from every region in the United States. The states reporting the highest number of fatal stings were Texas (29), California (18), and Kentucky, Virginia and New York (11 each). The states with the highest average death rates per 1,000,000 population were: Kentucky (0.38); Texas, Idaho and Wyoming (0.33 each); Virginia (0.30); and Oregon and Mississippi (0.29 each). The highest average death rates due to Hymenoptera can be pinpointed to the East South Central (0.29), the West South Central (0.26), and the South Atlantic (0.18) regions. Hymenoptera insects are found in every state (Michener and Michener 1951).

Venomous spiders caused fatalities in 23 states, and in every region except New England. There were 65 deaths from spider bites. The most spider-bite deaths occurred in Texas (9); North Carolina (7); Oklahoma, Kansas, and Missouri (5 each); and Kentucky, Arkansas and Georgia (4 each). The highest death rates per 1,000,000 population occurred in the following regions: West South Central (.14); East South Central (.10); West North Central and Mountain (.07 each); and South Atlantic (.06). According to most authorities (Comstock 1948, Gertsch 1949, Thorp and Woodson 1940), black widow spiders (Latrodectus sp.) are the only spiders in the United States causing human deaths. Levi 1958, classified Latrodectus spiders found in this country into 3 species: (1) Latrodectus mactans, the black widow spider; (2) Latrodectus geometricus, the cosmotropical brown spider; and (3) Latrodectus curacaviensis. With two exceptions, all spider-bite deaths were thought to result from bites by Latrodectus spiders. Two deaths which occurred in Missouri and Kansas were attributed to bites by "brown spiders" (Loxosceles reclusus), where they are abundant.

Of 8 deaths from scorpionism, 6 happened in Arizona and 2 in Texas. Of approximately 40 species of scorpions in the United States, only Centruroides sculpturatus and Centruroides gertschi are known to possess lethal venom (Stahnke 1956). These deadly species are localized in Arizona and its neighboring states. Scorpionism is a problem of considerable medical and public health

importance in Arizona, since scorpions kill more people there than do poisonous snakes (Stahnke 1950).

The 2 deaths from venomous marine animals (a stingray and a coelenterate) were recorded in Texas along the Gulf of Mexico. Injuries by stingrays are rather common in Southern California, the Gulf of California, the Gulf of Mexico, and the South Atlantic Coast (Russell et al 1958).

Seasonal Variation. While there may be some monthly variation in the incidence of venomous bites and stings for various regions of the United States, these minor differences should not obscure the seasonal pattern for the entire country.

Fatal poisonous snakebites begin to increase in March, reach a peak during August, and then decline after the end of October. Thus, 131 (95%) of 138 fatal snakebites happened during the 8-month period from March through October. Very few snakebite deaths occur during the winter months. Contrary to popular belief, most snakebite accidents do not occur during the hunting season. A similar seasonal distribution has been reported for nonfatal poisonous snakebites in several regions of the United States (Minton 1950, Swartzwelder 1950, and Wood 1954). Venomous snakes are more active during the warmer months and man experiences greater exposure to the possibility of a snakebite at this time because of out-of-doors recreation and occupation.

Hymenoptera deaths begin to increase in April, reach a peak during July and August, and then decline sharply after October. Of 229 fatal Hymenoptera stings, 217 (95%) happened during the 7-month period from April through October. Usually hornets, wasps, yellow jackets, and bumble bees die during the colder months, with only the queen surviving the winter to start a new colony the following spring. Only during the spring, summer, and early fall are there large numbers of active, stinging insects to come in contact with man. During this period of time, man experiences greater exposure to these insects from work and recreation in the yard, garden, farm, and woods.

While people died from spider bites during every month of the year, 42 (65%) of the 65 deaths from arachnidism happened during the 6-month period from May through October. Several investigators (Bogen 1926, 1932, Kirby-Smith 1942) have found that most black widow spider (Latrodectus mactans) bites happened from May through October. This seasonal distribution of bites is consistent with the life history of the black widow spider. The female of the species is responsible for most cases of envenomation in humans. The female survives the winter, while most male spiders die. She lays her eggs the following spring and early summer, and the prevalence of young and mature black widows is greatest during the late summer and early fall (Baerg 1923, Thorp and Woodson 1945).

Of 8 deaths from scorpionism, 3 occurred in April, 2 in September, 1 in December, 1 in January and 1 in February. This seasonal distribution of fatal scorpion stings differs from the usual seasonal incidence of nonfatal stings. In Arizona scorpion stings may occur during any month of the year, but they most frequently happen during the summer months (Stahnke 1950, 1956). Both fatalities from venomous marine animals took place during July, when swimming was popular.

Discussion. While venomous animals cannot be considered a major health problem in most regions in the United States, they do cause considerable morbidity and mortality in the South Atlantic, East South Central and West South Central regions. This study showed that there were "at least" 460 deaths from venomous animals in the United States from 1950 through 1959. The phrase, "at least," is used because many deaths from venomous animals probably are certified as resulting from other causes of death. Some physicians and coroners are not familiar with the signs and symptoms of envenomations by snakes, spiders, scorpions, insects, and marine animals. For example, arachnidism produced by black widow spiders is frequently confused with an "acute surgical abdomen" (Kirby-Smith, 1942, Wilson 1943). It seems possible that some spider-bite deaths were attributed to abdominal conditions, and the added insult of an operation may have contributed to the death of these persons. Likewise, many sudden deaths resulting from insect allergy probably are certified as due to "coronary heart attacks," "strokes," "heat strokes," and "natural causes." Swinny 1950, cited 1 death from insect allergy which was listed on the death certificate as due to "natural cause unknown." A single sting by an insect to an allergic patient may be sufficient to cause death. The local reaction to the sting, being minimal, may not be noticed by the physician or coroner signing the death certificate. Many of these victims are dead when first seen by a physician. A medical history is not available. Most snakebite deaths among adults are certified correctly. However, 29% of these deaths occurred in children less than 10 years of age. Oftentimes a small child cannot give an accurate history of what happened to him. This fact, coupled with a physician's unfamiliarity with snake venom poisoning, probably leads to an incorrect diagnosis in many instances.

Mortality studies provide only a crude measure of the extent of the venomous animal problem. Previous estimates of the number of people injured by venomous animals annually are probably far too low. For example, only 55 spider bite deaths were reported in the literature for a period covering over 200 years (Thorp and Woodson 1945). By way of contrast, 65 spider bite deaths were reported in 10 years in this study.

Mortality analyses reflect only the most serious injury (death) in the injury range of a disease. They do not measure the ill effects produced by nonfatal bites and stings. For example, 7 (17%) of 40 noncongenital, juvenile amputees seen by the Florida Crippled Children's Commission had an amputation because of a snakebite injury (McCollough 1959). The near fatal allergic reactions to insect stings have been described (Mueller 1959, Thomas 1958). Epidemiological studies of injuries caused by various venomous animals are needed to define this problem in greater detail, to discover ways to prevent these injuries, and to improve methods of treatment.

Black widow spiders (Latrodectus sp.) are believed to be the only spiders in the United States capable of killing a human being. However, two people in this study died from bites by "brown spiders" (Loxosceles reclusus). These are thought to be the first deaths reported in this country from arachnidism produced by brown spiders. Loxosceles reclusus was first incriminated

as the cause of necrotic arachnidism in Missouri in 1957 (Atkins, Wingo, Sodeman and Flynn 1957, 1958). Brown spider arachnidism in this country is strikingly similar to cutaneous arachnidism or "gangrenous spot" caused by Loxosceles laeta in South America (Macchiavello 1947). There is a viscerocutaneous form of South American Loxoscelism characterized by hemolytic anemia and hematuria. Recently several cases of viscerocutaneous arachnidism, thought due to brown spider bites, have been reported in the United States (James et al 1961, Nance 1961). Perhaps careful study will show that other fatalities are caused by brown spiders.

Physicians should find out what venomous animals are native to their states and become acquainted with current concepts of therapy for bites and stings by vanomous animals.

Summary. An analysis of deaths due to venomous animals showed that there were 460 fatalities from venomous animals in the United States during the 10-year period, 1950 through 1959. This provided an average of 46 deaths per year and an average annual death rate of 0.28 per 1,000,000 population.

Of 460 fatalities, Hymenoptera insects (bees, wasps, hornets, yellow jackets, and ants) killed 229 (50%) persons, poisonous snakes killed 138 (30%) persons, and poisonous spiders killed 65 (14%). Other venomous animals causing fatalities were scorpions, coelenterata, stingrays and unidentified venomous animals. The leading venomous killers were bees (124 deaths), rattlesnakes (94 deaths), wasps (69 deaths) and spiders (65 deaths). Two spider deaths were caused by brown spiders (Loxosceles reclusus); whereas the remaining spider deaths were caused by Latrodectus spiders.

Usually several hours elapsed before people died from bites by venomous snakes and spiders. Most deaths from Hymenoptera insect stings took place within 1 hour and resulted from insect allergy.

Most fatal injuries by insects, snakes, and spiders occurred during the warmer months of the year, from April through October. This coincides with the reproductive and life-habits of venomous animals and with greater out-of-doors exposure of man through occupations and recreation.

* * * * * *

Safe Holding Temperatures for Cooked Foods

The following is taken from BuSandA Manual, Volume III, paragraph 37776, Volume IV, paragraph 41741, Volume VIII, paragraph 82611. The holding times and temperatures described were recommended by the Bureau of Medicine and Surgery and will be incorporated in the forthcoming revision of Chapter 1 of the Manual of Naval Preventive Medicine.

"a. General. Protein foods which are not served immediately after cooking will be either chilled to temperatures of 40° F or lower (but not frozen) or held at 140° F or higher. Protein foods include meats, fish, poultry, gravies, meat stocks, soups, eggs, custards, cream fillings, and milk. Growth of harmful bacteria and the development of toxins (poisons) formed by the bacteria occur rapidly in cooked protein foods during holding at temperatures

between 40° F and 140° F. Cooked protein foods which have been held at temperatures between 40° F and 140° F for more than 3 hours will be considered unsafe for consumption and will be destroyed. If the product is refrigerated at intervals and then permitted to warm up, the total time of the various periods between 40° F and 140° F will be not more than 3 hours. Protein foods that are composed of ingredients which are hand-peeled, hand-sliced, or hand-diced after cooking will never be used as leftovers, the 3 hour limit between temperatures of 40° F and 140° F is usually taken in preparing, chilling, and serving the food. These foods include potato salad, chicken salad, macaroni salad, shrimp salad, egg salad, and similar items. Hand preparation not only increases the chance of contamination, but generally increases the length of time that these foods are hald at room temperatures. It is also dangerous to return opened jars or bowls of mayonnaise and cooked salad dressing from salad bars to refrigerators for reuse at a later meal. Because of the danger of miscalculation of total lapsed time that these salad dressings have been held at temperatures between 40° F and 140° F, mayonnaise and cooked salad dressings will be placed on the salad bar a small quantity at a time and will not be returned from the salad bar for reuse as leftovers.

"b. Leftovers to be Chilled. When leftovers or warm foods are chilled, care will be taken to assure prompt and thorough chilling (40° F or below) to the center of the food mass. Foods that are to be refrigerated will be placed in shallow pans to a depth of not more than 3 inches and will be covered with lids or waxed paper. Such foods will not be put in large deep pans, as chilling may take so long to get to the center of the food mass that sufficient time is allowed for growth of harmful bacteria and the development of a toxin. Any other procedure which might delay cooling also will be guarded against. Food to be chilled will be placed in the chill box immediately. Leftover food will not be saved for more than 36 hours. Freezing leftovers is prohibited.

"c. Special Meals. The 3 hour maximum time permitted for holding cooked protein foods at temperatures between 40° F and 140° F is of particular importance in the case of special meals (boat meals and flight meals). It is essential that in preparing and using sandwich fillings (those containing meat, meat food products, poultry, fish, and eggs) that close galley supervision and liaison with using units be maintained to insure continuous refrigeration. Such fillings must not be held for more than 3 hours between temperatures of 40° F and 140° F (total lapsed time in the galley and aboard aircraft or boats). Unopened cans of canned meat, chicken, and tuna will be issued in lieu of meat sandwiches when consumption is not anticipated within the 3 hour time limit between 40° F and 140° F; in these instances bread and butter sandwiches can be issued and consumed with the canned meat or poultry. Members of the using unit may desire to add the canned meat to the bread and butter sandwiches immediately prior to consumption."

NOTE: Paragraph c. above applies particularly to box lunches. Box lunches, if procured from civilian sources, shall be purchased only from civilian sources that have been inspected to assure that adequate sanitary practices are in force.

—Sanitation Section, PrevMedDiv, BuMed.

RESERVE SECTION

Promotion of Officers
(continued)

Inactive duty Naval Reserve Medical Corps officers selected for promotion to the grade of Lieutenant Commander by the selection board convened 23 April 1963:

Curbelo, Pablo G.
Dailey, Ronald F.
Dangelo, Nestore J.
Danis, Richard K.
Daum, Jere Jack
Davis, Edward K.
Davis, Herbert H.
Deer, Philip J.
De Guire, George B.
De Haven, Howard T.
Dienhart, C. M.
Dobies, Richard J.
Dockhorn, Charles H.
Doroshow, Louis W.
Douglas, Leonard W.
Drennan, James A.
Drinkard, James D.
Duncan, William L.
Dunnigan, William J.
Dziubinski, Emil H.
Easler, Richard E.
Ebbels, Bruce J.
Eisenberg, Selig
Elson, Shia Hyam
Engnoth, Milton Lori
Entwistle, F. R.
Erwin, William J.
Evarts, Charles M.
Evett, Russell D.
Falbo, Salvatore
Falk, Gerald D.
Falkenham, Elwin R.
Faverio, Charles D.
Fender, William N.
Fenton, Barry J.
Fernandez, Rafael
Fessman, John Willia
Filson, Edgar J.
Finch, John R.
Finke, Stanley R.
Finlayson, Birdwell
Fischbach, John E.
Fisher, Elbert L.
Fithian, William W.
Fleming, William H.
Fletcher, John C.
Folkman, Moses J.
Folkner, Albert
Ford, Walter R.
Forker, Edson L.
Forsher, Elmer H.
Foster, Douglas L.
Foster, Walter D.
Fox, Theodore C.
Franz, Adolph II
Frary, Richard D.
Frash, Devon Walters
Frederic, Myron W.
Frederickson, Eric A.
Freedman, Arthur M.
Freeman, John H.
Freese, Marcus James
Friedman, Paul L.
Frieseke, Oliver C.
Frost, Oakley M.
Fulmer, James S.
Galbraith, Nicoll
Galens, Gilbert J.
Galente, Louis Frank
Gantt, James R.
Gasteyer, Theodore H.
Gaudio, Louis R.
Gauthier, Donald W.
Gendzel, Ivan B.
Gentile, Dominick E.
Gilbert, Malcolm S.
Gillespie, James T.
Giorgio, Anthony J.
Glennon, Joseph A.
Glosik, George
Glover, James B.
Gluck, Charles M.
Goddard, John L.
Goguen, Norman P.
Goldberg, Jack A.
Goldman, Harvey
Gongguy, Ernest
Goodman, Alan H.
Goodwin, Jack E.
Goodwin, Robert F.
Goodwin, Stanley L.
Gramlich, Edwin P.
Greenberg, Paul M.
Grossman, Alan R.
Grozier, Michael L.
Gruninger, Robert P.

Gulledge, Jerry B.
Gunther, Albert F.
Hall, James G.
Hamer, Rodman S.
Hamilton, Thomas Percy
Hanfling, Carl
Hanson, Kermit H.
Harper, Charles R.
Harris, Donald T.
Harris, Jesse G.
Harshman, Morton L.
Haun, Thomas Milton
Hays, James W.
Heimbach, Sidney B.
Hendrix, Claude A.
Henry, Franklyn L.
Henry, John P.
Herber, Raymond
Herman, Bernard D.
Herman, Lavern H.
Hertenstein, R. D.
Hess, Robert M.
Hightower, Samuel J.
Hilger, John R.
Hill, David I.
Hodgkinson, Charles P.
Hoffman, Gerald G.
Hogan, Gerald P.
Hogan, Michael A.
Hollabaugh, E. R.
Holt, Glen Earle
Honet, Joseph C.
Hooper, Virgil R.
Hopfner, Edward A.
Horns, Norman M.
Huber, Kitchel H.
Hulquist, Charles R.
Hyatt, Thomas H.
Irwin, Willis L.
Jackson, Billy J.
Jacobsen, Ralph
Jaeger, Edward A.
Jagger, Paul I.
Johnson, Harry L., Jr.
Johnson, Hugh R.
Jonas, Saran
Jones, John E.
Jones, John P., Jr.
Jones, Kenric K.
Jones, Robert E.
Kane, James A.
Kaplan, Philip B.
Kaplan, Ralph J.
Kartalian, George
Kava, Herbert W.
Keep, Pliny M.
Keitges, Pierre W.
Kelley, Donald E.
Kendall, John W., Jr.
Kennedy, Frank L.
Kennedy, John Thomas
Kennedy, Thomas Martin
Kennemore, Douglas E.
Khafif, Rene A.
Kieger, Edward Frank
King, Francis Michae
King, Kyle W.
Kirson, Stanley M.
Kistler, Ray H., Jr.
Klaiber, Roger G.
Klaus, Sidney Nathan
Klein, Donald R.
Klein, Harvey Z.
Klotz, Hugh Alan
Knight, Curtis Craigen
Knight, Wallace A.
Knowles, Kenneth G.
Koehler, David L.
Kohl, David Harris
Kortzeborn, Jack Dean
Kowierschke, S. W.
Kraus, Richard T.
Krisher, James A.
Kristensen, K. A.
Krizek, Thomas J.
Kuehn, John L.
Kwit, Robert B.
Labriola, Gerald
Lang, Anthony E., Jr.
Lang, Sheldon
Lapp, Milton C.
Larson, Willard A.
Lauritzen, Richard E.
Lawrence, Harry M.
Lawson, James I.
Layzer, Robert B.
Leach, Robert E.
Leder, Marvin A.
Lee, Kenneth J.
Lee, Richard George
Lee, Robert E.
Lehmuller, Paul C.
Leith, David E.
Lenhart, Milton John
Leonard, John H.
Levine, David B.
Levine, Phillip Ross
Levinson, Monte Jay
Levy, Phillip M.
Lilly, Edwin J.
Lincke, Eric T.
Litwin, Allen
Lonngren, Robert A.
Lusskin, Bret L.
Lynch, Richard P.
Madany, Bahij H.
Maddalena, M. A.
Madison, Gilbert I.
Magidson, James Stev
Mahan, George M.
Maisel, John C.
Malowney, Robert C.
Malvaney, Errol D.
Mandell, Robert S.
Marasco, Joseph A., Jr.
Mark, Merle S.
Markel, Bennett F.
Marquardt, Victor C.
Martin, Richard Harv
Martinez, Phillip U.
Mason, James L.
Mason, Walter L.
Matthews, Josiah S.
Maultsby, James A.
McCann, John J.
McCann, Russell F.
McCormick, William F.
McDade, Brian G.

McDonald, Lawrence P.
McIvor, William Char
McKenna, John E.
McKnight, Robert L.
McRae, John A.
Meek, Joseph C.
Mengedoht, Daniel E.
Mercadolugo, Roberto
Mercer, Richard Lee
Meyer, William R.
Miles, Donald R.
Miller, Charles E.
Miller, Henry A.
Miller, Jess P.
Miller, Richard D.
Milner, Johnny E.
Mingione, Donald L.
Mitchell, Fenton M.
Monapo, William W.
Moon, Alfred Charles
Mooney, James C.
Moore, William E.
Morgan, Carl E.
Morris, Roger H.
Morrison, Gilbert C.
Morrissey, Eugene J.
Moses, Lyle
Mullaney, James Mich
Muto, Carl Nobuaki
Myers, Franklin L.
Neher, Frank R.
Nelson, George A.
Nelson, John R.
Nichols, Evans J.
Nichols, William F.
Nista, Joseph A.
Norman, Joe R.
Norton, Charles P.
Novak, Edward A.
Nuschke, John David
O'Brien, Frances I.
O'Brien, Thomas G.
O'Connor, Daniel J., Jr.
O'Dair, Robert B.
Osher, Eigene Marvin
O'Toole, Thomas F.
Overstreet, Robert G.
Overton, Clayton J.
Owen, Lawrence B.
Ozawa, Kenneth H.
Palmer, Fred L.
Palmer, Henry G.
Pappas, James J.
Pardue, Andrew M.
Pattee, Bruce A.
Patterson, Robert J.
Patterson, James Blake
Pavel, Alan
Payne, Stanley R.
Pearlman, Jerome T.
Pearson, John M.
Pelkey, Wesley J.
Pena, Angel B.
Pendley, Walter O.
Perry, Carl L.
Pfeilfr, William L.
Phillips, Milton C.
Pignataro, Ralph F.
Pillsbury, S.G., Jr.
Platt, Hubert O.
Plueddeman, Paul M.
Pluth, James R.
Polesky, Herbert
Porte, Daniel Jr.
Pratt, Russell J.
Primich, Frederic F.
Procter, William I.
Pryor, Charles A.
Purdy, Richard T.
Puziss, Harper
Quinlan, Edward Joseph
Radelat, Paul B.
Rankin, William E.
Raynor, Luther K.
Reibel, Donald B.
Reichel, Fredric
Relkin, Richard
Rex, Ira Harold, Jr.
Rhodes, Rollie E., Jr.
Richardson, James M
Richardson, Lavon P.
Riddle, Charles D., Jr.
Riley, Raymon S.
Rivers, Robert J.
Robinson, Charles W.
Rogers, Marian E.
Roland, Arnold S.
Rosen, Victor J.
Rosenzweig, Arnold I.
Roser, Donald M.
Rosmaita, John S.
Ross, Sherman
Rotz, Clifford
Rush, Richard Hudson
Ryan, Edward A.
Sagerman, Ronald
Salmon, James Henry
Salvo, Christopher J.
Sandoz, Ivan Luis
Saul, Richard Harry
Sauls, Henry S., Jr.
Schellinger, R. R.
Schlueter, Thomas M.
Schwartz, Marvin
Seale, Leonard M.
Searl, Richard H.
Seaton, Joseph R.
Secrest, John P.
Seibert, Warren C.
Sessler, Alan Davies
Shackner, Alvin Arden
Shanck, Robert B.
Shapiro, Bernard S.
Shaw, George P.
Shealy, Clyde N.
Sheldon, Edward J.
Shelley, Penn P.
Sher, Melvin H.
Sherlock, Eugene C.
Siddons, Ivan Doyle
Siebert, William E.
Silbiger, Gilbert
Silverman, Donald R.
Simmons, Jimmie D.
Simon, William C.
Simpson, John F.
Sistrunk, William
Skemp, Charles A.

(to be continued)

Navy Nursing Symposium

A Navy Nursing Symposium will be held at the U. S. Naval Medical School, National Naval Medical Center, Bethesda, Maryland, August 11 to August 24, 1963.

Naval Reserve Nurse Corps officers with or without previous active duty are eligible to attend.

Government messing and berthing facilities are not available.

Public lodging is available locally in hotels, motels, and tourist homes.

Uniform Service Dress Light Blue with Combination Hat and Garrison Cap.

The theme is Preparedness for Survival. Lectures, demonstrations and discussions will be given on topics of concern to military nursing.

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